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10/581,429

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Masao Naito

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER  
LLP

901 NEW YORK AVENUE, NW  
WASHINGTON, DC 20001-4413

EXAMINER

BERMAN, JACK I

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2881

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/581,429 | <b>Applicant(s)</b><br>NAITO ET AL. |  |
|                              | <b>Examiner</b><br>Jack I. Berman    | <b>Art Unit</b><br>2881             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2,4-8,10,11,13-23 and 27-33 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2,4-6,11 and 13-16 is/are rejected.
- 7) ☒ Claim(s) 7,8,10,17-23 and 27-33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/2/06, 2/20/07</u> . | 6) <input type="checkbox"/> Other: ____.  |

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 4-6, 11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aitken (U. S. Patent No. 5,099,130) in view of Ogata et al. (Japanese Patent No. 11-354064). Aitken discloses an ion beam apparatus comprising: an ion source which extracts an ion beam (not illustrated but inherently required to provide the existence of ion beam 11);

a mass analyzer (not illustrated but mentioned at lines 54-55 in column 4) which separates an ion beam of desired mass from the ion beam extracted from the ion source;

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a scanner (Y-scanner 17) which scans the ion beam that has been passed through the mass analyzer around a given scan center within a given scan surface in a symmetrical manner with respect to an incident axis of said ion beam (see FIGS. 4a and 4b);

an electrostatic deflector (converter 26), which has a pair of deflection electrodes (27 and 28 in FIG. 5) which are spaced apart from each other and mutually oppose, which electrostatically deflects the ion beam ejected from the scanner through  $90^\circ$  so that an ion beam of desired energy travels in a direction perpendicular to the scan surface within a circular-arc-shaped deflection zone centered on the scan center (see FIGS. 4a, 4b, 5, 6a, and 7); and

a scanning mechanism which retains a target for ion implantation and which mechanically, reciprocally moves the target in a direction in which the target crosses the ion beam ejected from the electrostatic deflector at a given angle wherein said scanning mechanism moves said target in a direction parallel to a surface of said target (see lines 50-53 in column 6 and FIGS. 4a and 5).

The Aitken apparatus inherently has three axes intersecting at right angles at one point that can be taken as X, Y and Z axes,

said ion beam is injected into said scanner in parallel to said Z axis;

said scanner which scans said injected ion beam with said scan center as a center within said scan surface parallel to a Y-Z plane; and

said electrostatic deflector which deflects an ion beam of desired energy in said injected ion beam through  $90^\circ$  so as to eject in parallel with said X axis;

when consideration is given of a locus of one ion beam having desired energy in said scanned and deflected ion beam, said locus assumes the shape of an arc-shaped section at an

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extremity of a linear section, said arc-shaped section being bent in the manner of an arc at an angle of  $90^\circ$  so as to become parallel to said X axis; and

mutually-opposing surfaces of a pair of deflection electrodes constituting said electrostatic deflector each have a shape generally aligned with a surface of revolution, said surface of revolution being drawn by said arc-shaped section when said locus of one ion beam is rotated through a predetermined angle in said scanning direction with reference to an axis passing through said scan center and parallel to said X axis (see lines 28-37 in column 8, which specifically mention an embodiment wherein said mutually-opposing surfaces of said respective deflection electrodes constituting said deflection electrode each assume a shape defined by means of circumferentially cutting a torus through a predetermined angle centered on a torus center axis which passes through the scan center and is parallel to the X axis, and cutting an outer periphery of a longitudinal cross-sectional surface of said torus through only  $90^\circ$ ).

Aitken also teaches that a beam mask (suppression electrode 38) which permits passage of an ion beam of desired energy and inhibits passage of ions of undesired energy may be disposed in the vicinity of an exit of said electrostatic deflector and that a scanned beam cross section of said ion beam passed from said electrostatic deflector, the scanned beam cross section perpendicular to a traveling direction of said ion beam, assumes the shape of an arc, which would inherently require that said beam mask has a beam passage hole having an arc-shaped geometry substantially similar to said arc-shaped scanned beam cross section.

Aitken does not specify a particular type of mass analyzer for separating an ion beam of desired mass from the ion beam extracted from the source, but Ogata et al. teaches that it is known in the art to use a mass separation electromagnet (fan-shaped electromagnet 2) to perform

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this function. In fact, this is the most common type of mass analyzer used for this function so it would have been obvious to a person having ordinary skill in the art to use such an electromagnet as the mass analyzer nominally recited by Aitken. Ogata et al. also teaches to provide an ion beam apparatus having both a scanner and a deflector that deflects the scanned beam to a substrate with an acceleration/deceleration device (acceleration tube 6) which is interposed between said scanner and said deflector and electrostatically accelerates or decelerates said scanned ion beam, wherein said acceleration/deceleration device has at least two electrodes (circular electrodes 6a, 6b, and 6c) spaced a given interval in a traveling direction of said ion beam; and each of said electrodes has a circular-arc shape centered on said scan center, and a beam passage hole which is wider than said scanned ion beam in said scanning direction. It would also have been obvious to a person having ordinary skill in the art to apply the teachings of Ogata et al. to the apparatus of Aitken by providing Ogata et al.'s acceleration/deceleration device in the Aitken apparatus in order to better control the energy of the ion beam. The entrance electrode of this device would also inherently serve as an analysis slit that permits passage of an ion beam of desired mass and inhibit passage of undesired mass.

Claims 7, 8, 10, 17-23, and 27-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach to use the particular voltage waveform claimed in claim 17 to apply to the scanner in the Aitken/Ogata et al. apparatus discussed above, or to form the two opposing electrodes of the deflector taught by Aitken as a plurality of segments with at least one gap.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on Monday-Thursday (8:30-7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jack I. Berman/  
Primary Examiner, Art Unit 2881

jib  
4/7/08